THE FARM INDEX

U.S. Department of Agriculture February 1975

Outlook

Don't be surprised to see net farm income nose down this year. Economists at this stage aren't speculating by how much, but they are saying the downturn from 1974's $27.2 billion could be sizable. Prices for major crops have weakened in recent months. Large prospective increases in 1975 crop production, coupled with reduced use, "could lead to considerably lower net farm income." On the other hand, reduced crop production of the likes of 1974 and lively demand could maintain farm incomes. For livestock farmers, receipts are seen a bit better than last year's poor performance.

After a bleak 1974, the situation for most farm inputs is looking better. But, farmers still have to contend with higher prices.

Fertilizers. Situation is more encouraging than in 1974, though it remains tight. Quantity of phosphates available for this year's crop is projected 14 percent higher . . . nitrogen supplies 6 percent greater . . . potash, 5 percent.

Pesticides. Except for a few bright spots, picture is decidely tight, with beginning inventories for many products a half below normal. Too, suspension of aldrin could create problems for corn producers since substitutes may not be there in amounts needed.

Fuel. Supply for farmers has improved considerably since last year. No shortages of gasoline or diesel fuel. Outlook for LP gas is less rosy. Demand might outrun supply by 4 to 6 percent through first half 1975.

Machinery. Situation is comfortable for hay balers and smaller tractors. For larger equipment, expect some delays, at least through midyear. Manufacturers are operating at near capacity and are gradually rebuilding inventories. Normal inventory levels won't be restored, however, till mid or late 1975, especially for the bigger units. Prices will keep climbing, though not at last year's clip.

The livestock industry is in the doldrums. The ratio of feed costs to livestock prices has not been favorable, forcing sharp reductions in placements of cattle on feed and in sow farrowings. The spring pig crop, in fact, might be the smallest since 1935. Poultry producers have trimmed output by 8 percent. The production cutbacks have yet to result in much strength in prices farmers get.

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Latest Report

Here are the release dates for ERS's outlook and situation reports through June. Single copies are available on request. Each report also has a mailing list to which your name may be added.

Subject	Summary released to press	Publication available to public
Agricultural Outlook Digest	Feb. 25	Mar. 6
Poultry and Egg	Feb. 27	Mar. 7
Fruit	Feb. 28	Mar. 10
Agricultural Supply and Demand	Mar. 18	Mar. 18
Tobacco	Mar. 19	Mar. 27
Rice	Mar. 24	Apr. 1
Agricultural Outlook Digest	Mar. 25	Apr. 3
Cotton	Mar. 31	Apr. 8
Fats and Oils	Apr. 1	Apr. 9
Livestock and Meat	Apr. 2	Apr. 10
Vegetable	Apr. 23	May 1
Agricultural Supply and Demand	Apr. 25	Apr. 25
Agricultural Outlook Digest	Apr. 28	May 7
Dairy	May 6	May 14
National Food Demand and Price	May 8	May 16
Agricultural Supply and Demand	May 9	May 19
Outlook for Agricultural Products	May 12	May 12
Marketing and Transportation	May 13	May 13
Feed	May 15	May 23
Wool	May 16	May 27
Wheat	May 19	May 28
Agricultural Outlook Digest	May 20	May 29
Poultry and Egg	May 23	June 4
Livestock and Meat	May 27	June 5
Cotton	June 2	June 10
Agricultural Supply and Demand	June 6	June 16
Tobacco	June 11	June 11
World Agricultural Situation	June 13	June 24
Fats and Oils	June 19	June 27
Agricultural Outlook Digest	June 20	June 30
Fruit	June 25	July 7
	June 30	July 9

On the average, food we paid a dollar for at the end of 1974 could cost as much as 5 cents more by midyear. That's the latest reading of retail food prices by ERS economists. This might sound like a lot but it's less than the 6 percent recorded in the first 6 months of last year.

Much of the surge in early 1975 will be due to steeper marketing margins and food processors recovering the cost for raw products bought in 1974. Retail price advances in April-June will mirror rising farm prices for meat animals and seasonal price jumps for fruits and vegetables.

Outlookers caution, however, that the food price picture is veiled by uncertainties, these in particular:

(1) Impact of the recession on food demand; and (2) how fast grass-fed cattle move to market. If consumers tighten their belts—and non-fed beef output remains large through the spring—then retail food prices may rise less than predicted. But if the economy snaps back sooner, or if beef output shrinks further, the current food price forecast could be conservative.

The story for second half 1975 hinges on weather and what it will do to farm production here and abroad. Good weather with the prospect of large harvests could make the pendulum swing the other way—meaning, a substantial slowing in food price gains by midyear and some declines in late 1975.

Value of our farm exports continues to pile on the records. Current projections call for shipments of $22 billion for the fiscal year ending next June 30, up from the record $21.3 billion in fiscal 1974. This makes the 6th increase in a row. Ton for ton, exports in fiscal 1975 will drop, but higher prices for many items will more than pick up the slack.

The gainers among major commodity groups: grain and feed (up 7 percent to $11.5 billion); oilseeds and products (2 percent to $5.4 billion); fruits, vegetables, nuts, and preparations (9 percent to $1.2 billion); dairy and poultry products (50 percent to $300 million); and sugar and tropical products (10 percent to $315 million).

The losers: cotton (off 23 percent to $1 billion), and livestock and products (down 14 percent to $1.4 billion).

On the other side of the trade ledger, agricultural imports should total an estimated $10.7 billion in fiscal 1975, some $1.2 billion above last year. Subtracting expected imports from exports once more puts agriculture's trade balance in the black . . . over $11 billion in fiscal 1975 and just $800 million shy of last year's.

The fast food industry is fast in another sense. The last couple of years have seen it grow at an annual rate of over 10 percent. By 1979 this industry expects to sport some 60,000 outlets (50 percent more than last year), and this doesn't include overseas operations. Foreign expansion plans are even more optimistic—250 percent by 1979.

Export potential for U.S. food outlets is estimated at $500 to $800 million 4 years from now. Most fast food companies have targeted Japan for their expansion plans. Market prospects also look especially inviting in Australia, Europe, and Canada.

Grain farmers who worry about serious transportation snags this year may be fretting unnecessarily. At least, things won't get as sticky as in the 1972-74 period. Reason is that present grain stocks—both privately held and Government owned — have been shaved considerably. Also, storage facilities seem adequate. Though some shippers might face transport shortages, particularly if the 1975 harvest proves unusually big, much of the crop could be stored locally before shipping.

Keep your calendar open for November 17-20. That's the time of the 1976 National Agricultural Outlook Conference to be held as usual at USDA headquarters in Washington, D.C. Theme will be announced later.

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The Farm Index is published monthly by the Economic Research Service, U.S. Department of Agriculture. February 1975. Vol. XIV. No. 2.

Readers are invited to write for the research materials on which we base our articles. Address queries to The Farm Index, Rm. 1664, Economic Research Service, U.S. Department of Agriculture, Wash., D.C. 20250. Please cite article titles when ordering.

Contents of this magazine may be reprinted without permission. They are based on research of the Economic Research Service and on studies done in cooperation with State agricultural experiment stations. The Secretary of Agriculture has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this publication approved by Director of the Office of Management and Budget, May 24, 1972. Subscription price $7.70 yearly ($9.65 foreign). Single copies 70 cents. Order from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Neither the doomsayers nor the Pollyannas will walk away completely satisfied after reading *The World Food Situation and Prospects to 1985*. One of the more widely publicized studies put out by ERS economists in 1974, it melds the good news with the bad.

But throughout this 90-page report threads a hope that the world's less fortunate nations can fend for themselves if official policies by the world's countries are steered in the right direction by their governments.

The researchers do not dismiss reality. The fact is, problems abound in the world food picture, not the least of which are the vagaries of weather. Also, we cannot be sure that known technology in food production will be applied properly, or that new technological developments will be available when needed.

As put by the authors: "This study does not support the judgments that world food supplies per capita are likely to decline or that the growth of the world food supply is likely to lag behind demand. Yet these possibilities cannot be ruled out.

"In view of the uncertain nature of food supplies," the authors continue, "it would seem to be wise social policy to insure against major shortages . . . and to be prepared to pay reasonable cost to maintain moderate stocks or reserve capacity or to absorb some surpluses should they result."

On the next several pages, The Farm Index has tried to capture the essence of the recent ERS analysis. The editors acknowledge our writeup may not do justice to the full report, so we invite our readers to write us for copies and, for more details, to write the economists who did the work.

The first two sections discuss the events leading up to the situation facing us today. The next two sections bear down on basic problems that world agriculture must hurdle to meet food demand, and on the possibilities for doing so. The last two sections discuss what the "have" nations are doing for the "have-nots," and the options for food security in the future.

In brief, the summary of the ERS study makes these observations—

- Many views of the world food situation focus on immutable forces or circumstances (such as the limited surface of the earth, changed climatic patterns, or the fixed nature of consumption patterns) which are thought to be beyond the control of people.

The analysis in this study indicates, however, that much of what has happened in the development of the world food situation can be traced to government policies and basic human conditions (such as income distribution and poverty), and suggests that governmental and individual choices will continue to be critical in the future.

- Food stocks can provide insurance against shortrun dips in production. An important insurance against longrun shortfalls is a backlog of resources and basic and applied agricultural research, supported by policies and institutions through which research and resources can be quickly moved into the fields to increase production. Agricultural research needs to be directed especially toward the problems of increasing productivity in the developing countries where modern scientific agriculture is only beginning to be adopted.

- The phenomenon of high food prices and uncertain food supplies arose out of a combination of circumstances, policy changes, and longrun development trends, which raise very important issues but which do not indicate a longrun shortage of food supplies.

- Among the major impediments to increasing food production in both the developing and the planned economies are policies designed to maintain low and stable food prices to consumers. These policies have dampened the farmers' incentives to produce food in some of the countries and have partly made necessary their large grain imports.

Will the real cost of food be higher in the future than in the past? It probably will be higher because certain food prices, particularly grain prices, were especially depressed during the years immediately preceding 1972, and because important food production inputs such as fertilizer will be more expensive.

Nominal food prices will also be higher because of inflation. But when food production is increased to overcome recent shortages, food costs can be expected to fall to a level considerably below present prices.

Has the world sufficient resources to continue to increase food production? There is sufficient land and raw materials for productive inputs to greatly increase food output. How fast production will increase, and whether this increase in food production will take place mainly in the developing countries, will depend more on policy decisions than on natural forces or raw material inputs.

Will food supplies and prices continue to be unstable? This will depend partly on policies adopted with respect to food stocks. Instability in the world's weather will produce instability in the supply of food unless reserve measures are adopted. Because of the inelastic demand for food, the absence of stocks will result in major fluctuations in prices whenever the growth in supply departs much from the growth in demand.

Does "rising affluence" impose a restricted diet on the world's poor? Should consumption of livestock products be reduced to permit more basic food grains for poor people? Food consumption patterns around the world are determined by income distribution and by the type and quantity of basic foodstuffs produced in each locality.

In the short run, if grain supplies are limited as they are now, high consumption by the affluent raises prices and thus restricts the diets of the poor. In the longer run, the price of food depends on many factors, including governments' policies, which are more important than the level of consumption of the affluent.

Are there developments in the world's climate which will limit increases in food production? There is insufficient evidence to support such a conclusion, but world weather is unstable and unpredictable and the world needs to be better prepared for adversities than it has been since 1972. In the short run, such preparedness requires food stocks. In the medium term, excess resources could also help, but in the long run, it requires a backlog of technology to deal with protracted adversities that can be expected to occur.

Should agricultural policies around the world be adjusted? The growing imports of food grains by developing countries, the sporadic but progressively larger imports of grains by the planned economies, the potential for surplus production in developed countries, and the declining share of developing countries in world agricultural trade, all point to the need for serious reconsideration of agricultural policies in many countries.

THREE ANXIOUS YEARS

In 1972, the world food situation made an about-face from surpluses and moderate prices to food scarcity and soaring costs.

The decline in world food output that year averaged out to only 1.6 percent, but it hit some countries harder than others, coming down hard on prices, trade patterns, and per capita food production levels.

In 1972, world grain output plunged 35 million tons—roughly the equivalent of 1 year's average increase.

That loss was offset by bumper harvests in 1973, but prices continued high and carryovers remained low. And by the end of 1974, the weather-ravaged harvest brought the world food situation to an even more precarious state.

Other forces. The poor grain harvest in 1972 wasn't solely to blame for the drawdown in world food supplies. Spiraling grain consumption and a gain and shift in international grain trade also played key roles.

From 1969 to 1974, grain use topped production every year but 1971 and 1973. Paced by massive sales to the Soviets in 1972 and the widespread poor crops that developed later that year, world grain exports shot from 111 million tons in 1971/72 to 151 million in 1973/74.

Inevitably, world grain reserves shrank, with the U.S. absorbing most of the decline. During 1972-74, when world wheat stocks were whittled from 74 million to 56 million tons, U.S. wheat stocks fell from 24 million to about 7 million tons. And the U.S. accounted for about all of the 26-million-ton drop in global feed grain stocks.

Towering prices. Crop shortages, soaring imports, dwindling stocks, and adverse economic conditions combined to drive up farm product prices. Hardest hit were food grains—wheat and rice. World wheat prices rocketed from $60 per ton in early 1972 to $210 in early 1974. The price of rice vaulted 300 percent to $570 per ton.

While worldwide inflation and economic growth upped the tab for just about everything, food prices shot up exceptionally fast. Between October 1972 and August 1973, the U.S. wholesale index of prices of farm products and processed foods and feeds had risen from 22 to more than 80 percent over the 1967 mark.

Surge in farm incomes. The impact of steeper food prices reached the farmer in late 1972. The following year, farm income in the U.S., Canada, and Australia soared at least 150 percent over 1970 levels. Gains in other developed countries proved less spectacular but still hefty: West Germany, 27 percent; the United Kingdom, 100 percent; and France, the Netherlands, and Japan, about 55 percent.

In the more affluent countries, where world prices quickly show up at the farm level, farm earnings stayed well above production costs and family living expenses. But other prices caught up by mid-1974, boosting production costs.

Producers in poorer countries, in contrast, have weaker links to world farm prices. Soaring world market prices undoubtedly raised some incomes in these countries, but this did not happen in a number of developing nations.

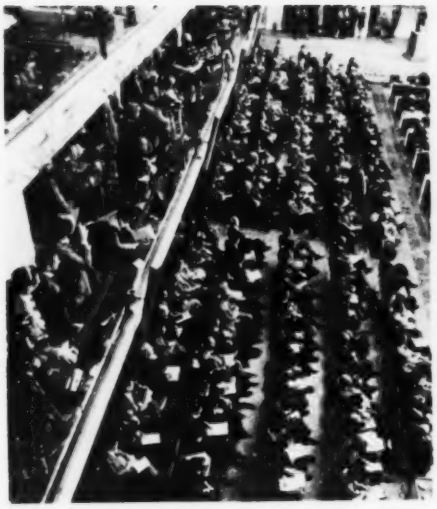
Bigger bills for consumers. The jump in farm prices quickly translated into spiraling consumer prices. In most industrial countries, food prices climbed more than 7 percent in 1973 and by 12½ percent from March 1973 to March 1974. Some of the sharpest hikes in consumers' food bills occurred in the major food exporting nations—the U.S., Canada, and Australia.

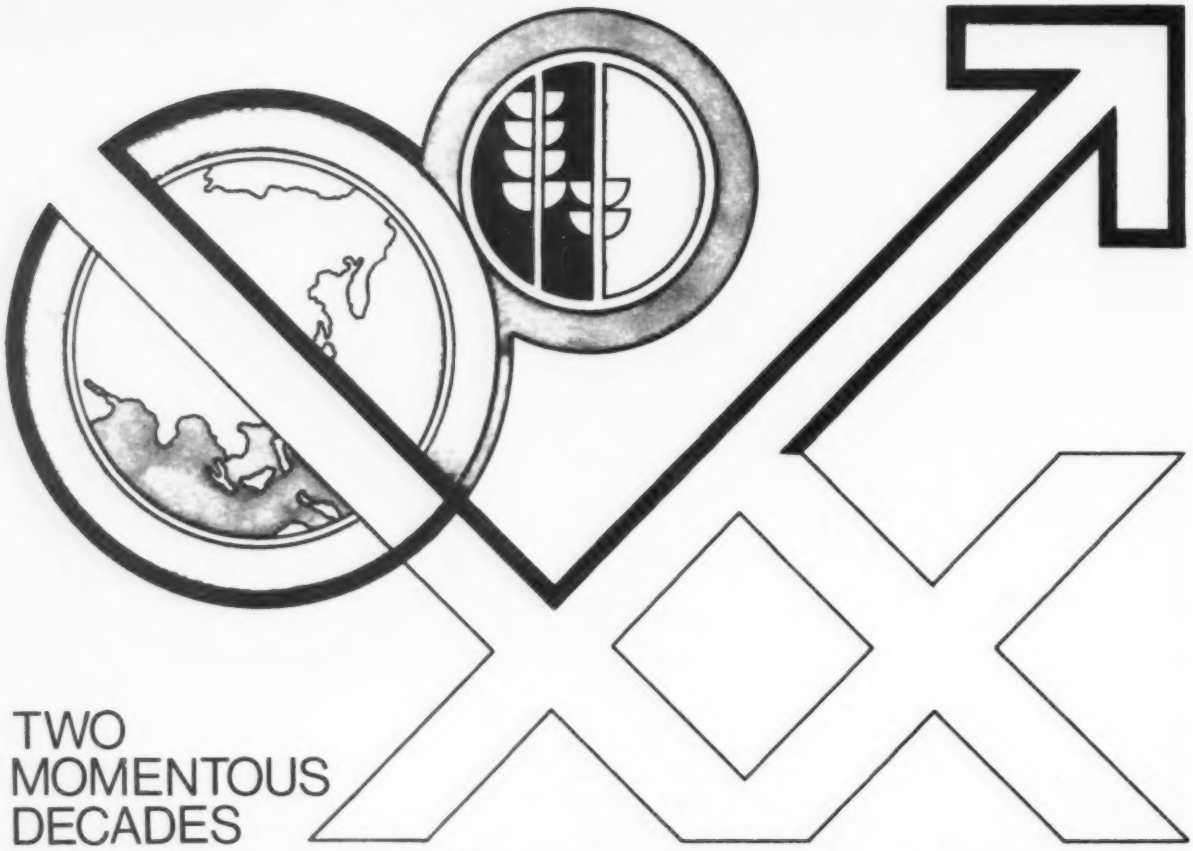
Even in these developed countries, food takes up between 30 and 55 percent of the consumer price index, except for the U.S., where it accounts for only 22 percent—the lowest percentage in the world.

In developing countries, where food takes an even bigger bite of consumer living expenses, high world farm prices had particularly severe consequences, especially in countries dependent on food imports.

Consumer prices climbed only moderately in the European Community, whose Common Agricultural Policy shields internal farm and food prices from changes on the world market. And the centrally planned economies like the U.S.S.R. and Eastern Europe experienced virtually none of the runaway prices—even though their grain imports helped push prices up.

Global attention focused on Rome early last November, as delegates to the World Food Conference deliberated on the world's ability to feed its people. The conference was attended by the 130 member countries of the United Nations and other representatives. Proclaiming that every human being has the "unalienable right to be free from hunger and malnutrition . . ." the conference adopted 19 key resolutions on food aid, production, security, and trade. It also established an early warning system on food and agriculture and set up a World Food Council to advise the U.N. of world food needs and coordinate international food aid and agricultural development efforts.





TWO MOMENTOUS DECADES

What led up to the severe economic straits of 1972-74 and the precarious food situation? Some of the answers are rooted in changes in food output and use over the past 2 decades and how governments responded.

Before the 1972 crop shortfalls, three basic trends had gained firm footing:

- Developing countries were experiencing an ever-widening gap between food production and need,
- Centrally planned economies were incurring sporadic but mounting grain import deficits, and
- A number of developed countries were saddled with persistent food surpluses.

Behind these developments loomed a number of related changes . . .

- Per capita food production was advancing at a slow pace in developing countries, prompting heavy reliance on food aid and imports, especially during poor crop years.
- Developed countries were becoming more self-sufficient in food production and cornering a widening share of the world export market.
- Food and fertilizer prices were at bargain levels, encouraging heavy use of grains in livestock feeds, and stepped-up grain exports.
- Numerous government programs were continuing to spur farm production in the developed countries—leading to surpluses in the mid-1950's. But since 1967, efforts to eliminate these surpluses led to a slowdown in food output and a drawdown in stocks.
- Policies in the "have-not" nations tended to discourage farm production until the technology of the Green Revolution gave farmers the incentives to produce more. But pressure for further advances tended to wane in following years.

Food Production

The widening world food gap and mounting import demands of the Soviet bloc countries have focused attention on the relatively slow growth of world grain production in the past 5 years and the erosion of the world's grain stocks. The question is, do these trends point to a slowing of the world's food producing capacity?

Over the past 2 decades, world food output declined only once—in 1972. Meantime, production outpaced population growth, resulting in a 17-percent jump in food output per person.

Prices of grain and most other food and farm products remained stable or declined between the mid-1950's and mid-1960's, proving especially low during 1967-71. Low prices for fertilizer and ample sup-

plies hastened the spread of the Green Revolution, as well as productivity gains in the affluent nations.

In the late sixties, food output advanced faster in the developing countries than the richer nations. But this was partly because several developed nations began to restrict production when large-scale food aid shipments did not keep up with mounting surpluses.

Plenty of people. While production rose faster in developing nations, so did population growth. Annual population gains in the industrial nations have dropped from 1.3 percent in 1961 to just under 0.9 percent. But developing countries are now adding people at an annual rate of 2.5 percent—up from 2 percent in 1950.

The upshot has been painfully slow growth in per capita food production among the poorer countries. Developed nations now produce 33 percent more food per person than in 1954, but the developing countries, only 8 percent more. And while the relatively small decline in crops in 1972 pared per capita production only slightly in affluent nations, it was enough to reduce output in developing nations to levels reached a decade earlier.

Grains

Grain forms the mainstay of the world's food supply, and changes in supply or demand are a reliable barometer of the world food situation. From 30 to 70 percent of the value of food production in every region of the world is provided by grains. For the earth's poorest people, grains are the major source of food. But in very wealthy nations, more grains are consumed by livestock than by humans.

Total world grain production—including paddy rice—swelled some 400 million tons from the early 1960's to 1,320 million tons in 1973. Improved yields were the driving force, as acreage expanded only about 35 million hectares.

Mixed growth. In the past decade, grain area, production, and yields grew at varying rates among the world's leading producers. Japan, for example, reduced its grain area roughly 3½ percent a year, while Australia and New Zealand upped theirs by about the same amount.

Among developing nations, East Asia and East Africa boosted areas and yields substantially for production gains of around 5 percent a year. Other emerging nations raised their annual output about 4 percent, but almost entirely by bringing more land under the plow.

Rice yields in developing countries, where more than 90 percent of the world's rice is produced and eaten, barely topped 1.5 tons per hectare in the 1960's—compared with more than 5 tons per hectare in developed nations.

Trade

Over the past 2 decades, the developed countries upped their share of the farm export market from 45 to more than 60 percent. Meantime, the developing countries' portion shrank from 45 to 28 percent.

Trade in grains followed the same pattern, with shipments by industrial countries shooting from 61 percent of the world market in the late fifties to 83 percent in 1972. At the same time, the share of grain exports from developing countries tumbled from 23 to 11 percent, and in centrally planned countries, from 16 to 6 percent.

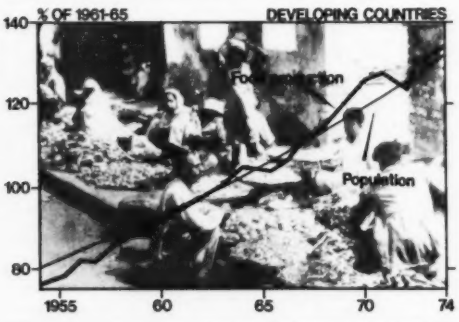
Soviet turnaround. Before 1963, the U.S.S.R. made up deficits from grain production shortfalls by drawing on stocks, slaughtering livestock, and simply using less. The poor crops in 1963 and 1965 led them for the first time to make large grain imports to partially offset the deficits, and they covered the entire 1972 shortfall by imports.

Sharply curtailed cereal production in India in 1965 and 1966 joined with the 1965 Soviet shortfall to send grain exports soaring during 1965-66 and to melt world stocks the next year.

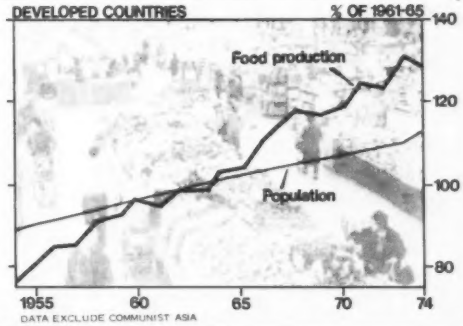
Mounting dependence. Thus, over the past 2 decades, but especially during the 1960's, the planned economies and the poorer nations came to depend increasingly on the developed countries for grain supplies.

Among developed countries, Western Europe and Japan also rely heavily on the grain exports of Argentina, Australia, Canada, and the U.S.

Dramatic shifts in world grain



People in the developed and developing country groups have not fared equally in the roughly equal growth in food production. In developing nations, population gains have absorbed nearly all of the production increase.



trade posed little problem during the sixties, when stocks were abundant. Food aid to developing countries provided an easy outlet for stockpiled grains, as did occasional commercial sales to the centrally planned countries.

New outlook. But now, with low stocks in exporting countries, high grain prices, and reduced supplies for food aid, the increasing dependence of less developed countries and centrally planned economies takes on an entirely different meaning.

Grain deficits in the "have-not" countries are mainly for food grains—wheat and rice. In the past, about half the deficit was supplied by food aid shipments. Many of the developing countries found it difficult to finance commercial imports.

Food grains—mostly wheat—also make up most of the grain imports of the centrally planned countries. Though these are commercial sales, sharp year-to-year changes in quantities are a major destabilizing force on world grain markets.

Surpluses

Concern in the mid-1960's about an impending world food shortage stimulated grain production in exporting countries, rapid growth in fertilizer producing capacity, and the Green Revolution's drive to lift output in developing countries.

Results were impressive. World grain output rebounded sharply and stocks peaked at 191 million tons at the start of the 1969/70 marketing year.

Then came a predictable reaction. Major grain exporters cut back crop production — particularly wheat. From 1968 to 1970, combined wheat area of the U.S., Canada, Australia, and Argentina plunged from 50 to 33 million hectares and production slipped from 80 to less than 60 million tons.

Looking back. Had the four countries maintained their previous wheat area, they would have turned out some 90 million additional tons from 1968 to 1972.

While major grain exporters were trimming production, the U.S.S.R., several European countries, and Japan continued to expand output.

Exceptionally low prices during 1967-71 encouraged heavy feeding of grains to livestock, consumption in excess of production, bigger exports, and the eventual drawdown of stocks in 1972.

Price Protection

International grain prices often bear little resemblance to those faced by producers and consumers in different countries around the world.

That's because many countries have at various times adopted policies that tend to insulate domestic prices from world prices.

In the U.S., for example, market prices for wheat and corn drifted steadily lower during 1954–71, a time when international prices were fairly stable. But while prices to grain users fell to very low levels, the returns to farmers for their wheat and corn didn't—due to Government price supports. American grain farmers got better-than-market prices in this period, and domestic users as well as importers paid less than the going price on the world market.

Japan and the European Community (EC) operated systems that held farm prices far above world prices up to 1972. And when the farm price of Japanese wheat shot to $636 per ton in 1973, it rose even above the unprecedented levels that world rice prices reached in late 1973 and early 1974.

Within the EC, the doubling of U.S. wheat export prices from 1971 to 1972 had virtually no effect on EC grain prices in local currencies due to the Community's system of variable import levies. Grain prices in all member nations but Italy rose only a tenth from 1971–74, whereas the world price tripled.

Prices in the U.S.S.R. and other centrally planned economies aren't necessarily determined by supply and demand, or even production costs. Thus, while huge Soviet grain imports in 1972 and 1973 quickly drained the stocks of major exporters, the resulting price hikes didn't affect Soviet producers and consumers directly.

Prices received by state and collective farms in the Soviet Union haven't risen since 1970. And the tumultuous world price increases of 1972–74 failed to jar state store prices for meat and bread, which haven't changed since 1962.

Food and farm prices in developing countries are more difficult to measure and collect. Part of the problem is that so much food is produced and used by remote farm families having little direct contact with outside markets.

Also, government policies in many poorer nations tend to discourage production. A typical approach is to tax exports or manipulate prices in such a way that returns to farmers range below what they would be without the tax. This happens with rice in Thailand, rice and cotton in Egypt, grains and meat in Argentina, and peanuts in Africa.

Another method, followed by Thailand, Egypt, Indonesia, Sri Lanka, and some other countries, is to maintain low stable retail prices for basic foods like cereals.

Why such policies? Within the less developed nations, food takes a big chunk of most consumers' incomes. It's feared that if basic food prices escalate, wages would have to be adjusted higher—to the detriment of economic growth.

AN ELUSIVE BALANCE

Since Malthus first proposed his gloomy population-food theory some 200 years ago, waves of pessimism have periodically swept over the globe when food shortages appeared.

This, too, is a period of great international anxiety about the world's ability to feed its growing population. The rapid turnaround in the past 3 years from a time of food surpluses and low prices to a time of shrinking grain supplies, spiraling prices, and regional famines has prompted some analysts to wonder if the "dismal scientist" would have the last say after all.

To some observers, recent world food developments indicate that the world is running out of food-producing land; that essential yield-raising inputs, especially fertilizer, are becoming scarce; that future increases in crop yields will come slower and be harder to achieve; and that world weather patterns are changing to a more erratic and less favorable climate for food production.

But how do these grim speculations stack up with recent studies and projections of world agricultural capacity?

Production outlook. In their review of factors affecting food supply and demand, ERS economists cited several serious stumbling blocks and areas of immediate concern, but found no evidence of impending doom.

On the contrary, the world appears able to meet its overall production needs in coming years—with output keeping "a half step" ahead of population growth. Researchers have concluded that the factors giving rise to current world food problems are largely temporary aberrations that can be corrected by intelligent policies.

However, all recent studies have indicated that future grain production will be more and more unevenly distributed unless programs are adopted to reverse this trend. Even the most optimistic projections to 1985 point to the increasing dependence of developing countries on food imports to fill their growing food deficits in the next decade.

Here's a background look at the world supply situation and the factors affecting food supply—availability and use of land and other resources, yield-raising technology, and that crucial variable, the weather.

Land Availability

Concern over future land availability is no recent development. Despite the continuing cultivation of new lands, especially in developing countries, fears of one day running out of this resource have recurred during anxious food supply periods since Malthus' time.

However, several recent land studies all reached essentially the same conclusion—at least twice as much potential cropland is available as is currently being used.

Plenty of land. A UN Food and Agriculture Organization survey found that while only 26 percent of the total land area in developing countries (excluding the Near East) was suitable for crops, just 45 percent of this land was actually used in 1962. Parts of Asia and Northwest Africa appeared to be approaching the limits of available land for traditional forms of crop production—primarily because of Asia's heavy population density and North Africa's extensive desert areas. Irrigation potential was excluded from FAO's assessment.

FAO estimates that an additional 5 to 7 million hectares could be brought into food production at reasonable costs.

A more recent Iowa State Univerity study estimated that only 3.4 billion acres out of a potential 7.8 billion acres worldwide are now being used for crop and livestock production.

Limits to expansion. So the world is clearly not running out of land. But available land is not evenly distributed, and serious agricultural limitations exist in some regions because of population pressures and the difficulties of increasing yields and production with centuries-old technologies.

Human labor, draft animals, and homemade equipment, ditches, and wells are often the only means for farmers in developing countries to augment their land's productivity. Consequently, increasing planted acreage has been crucial to boosting food production in much of the developing world.

However, in many areas, such as the Nile Valley, Bangladesh, and parts of India, high population densities severely limit opportunities for expanding cultivation.

Technology's the key. The developed countries, on the other hand, rely

on nonland inputs and improved technology to increase their food production. All recent studies have concluded that outside of Latin America and Africa, bringing more land into use will probably make a progressively smaller contribution to food supplies, even in most developing countries. The key to future growth is yield-raising technology.

Fertilizer Supplies

Fertilizer is a critical input for yield increases, and an increasingly costly one. Current record-high prices for fertilizer are largely the result of a sharp jump in demand—fueled by high agricultural prices—combined with a very limited capability to expand shortrun supplies. In addition, high energy prices have raised production costs substantially, especially for energy-intensive nitrogen fertilizer.

If world fertilizer consumption remains roughly on trend, short supplies and high prices can be expected to continue into 1975 and 1976. Manufacturers in developed countries are now using available plant capacity at near maximum levels in response to price hikes and shortages. Much idle capacity still exists in developing nations, however, and marked improvements in their plant operating rates could possibly provide the critical margin between shortage and sufficiency.

Prospects for prices. Meanwhile, fertilizer prices will likely press upward in the next 2 years, but not at the soaring rates that prevailed between mid-1973 and early 1974.

Current price levels and problems locating supplies have already dampened some planned purchases, particularly in developing countries hit hard by escalating food and oil costs as well. These developments have severely hampered efforts to boost food output in the relatively land-scarce nations of Asia, where fertilizer is crucial to production gains.

On the whole, the longer term supply outlook is a bit brighter. Between 1973 and 1980, world fertilizer consumption is expected to rise at an annual rate of 5½ percent, with nitrogen consumption growing slightly faster than that of phosphate and potash.

Expansion plans. Plans for a substantial expansion in nitrogen capacity have been announced in the past year. Although investment costs, start-up delays, and scarcity of necessary parts and skilled personnel could curtail these commitments, a modest nitrogen surplus might begin to materialize in the late 1970's.

By 1980, surplus nitrogen capacity could amount to as much as 5 million tons, based on the Tennessee Valley Authority's 1980 demand estimates. The World Bank's higher demand estimate would still provide a surplus of nearly 2.5 million tons.

Limited usage gains. These projections indicate an adequate supply of fertilizer, but economists note that their estimates do not allow for a significant increase in the rate of fertilizer use. Additional capacity

would be required to handle a major sustained rise in the developing countries' usage rates.

As supply catches up with demand, fertilizer prices can be expected to decline considerably. However, future technological advances are not likely to overcome increased production costs, as in the past, because of higher plant construction and energy costs.

In contrast to USDA's outlook for a possible surplus of world production capacity in 1980, the World Bank's fertilizer study indicates a large production gap in 1980/81 for nitrogen and phosphate.

Capacity needs. Their supply projections assume that much of the planned production increase in developed countries will be held back by high energy prices. Consequently, their study is concerned with the problem of creating enough capacity in the developing countries not only to enable these nations to become self-sufficient by 1980/81 but also to supply roughly one-fourth to one-third of the projected gap in developed countries.

Locust control: a government official introduces a modern insecticide to Afghanistani farmers; an Ethiopian flagman directs crop spraying from atop a termite hill. The U.S. aided both programs.

These contrasting views of the future raise some fundamental issues that can't be resolved by economic projections. Neither the USDA nor the World Bank studies suggest a substantial increase in the rate of fertilizer use over the rates prevailing in the late 1960's—yet that was a period of relatively slow growth in grain output. Faster growth in grain production, especially in developing nations, will require stepped-up use of fertilizer.

Obstacle course. However, this is not likely to happen if developed countries should bid needed fertilizer away from the developing countries in times of shortage. There is an obvious need for more fertilizer production in the developing world, but some of the obstacles to obtaining this increase include: the fluctuation between overcapacity and undercapacity that plagued the fertilizer industry in the past; the serious underutilization of capacity in developing countries; and the problem of generating desire among the oil-rich nations to use some of their wealth to finance fertilizer factories.

Raising Crop Yields

In addition to worrying over future land and fertilizer supplies, some analysts also question whether technological advances will permit future increases in crop yields at past rates.

Most of these questions stem from an apparent slowdown in the rate of yield gains for some crops in developed countries, as well as from an apparent loss of momentum in the developing world's Green Revolution.

However, an ERS study of yields in the world's major grain producing areas from 1950-73 found no evidence that growth in grain yields is declining.

Yields still growing. In fact, the analysis showed that a greater share of the yields were above trend in 1970-73 than in any period since the first half of the 1950's.

Another indication that sizable yield gains can still be achieved in developed countries is the large gap that separates their lowest and highest yields. Within individual countries, the same pattern exists for different farms. As yield-raising technologies are exploited by an increasing number of farms, average yields can be expected to rise.

The developed countries' production advances after World War II were primarily due to greater use of fertilizer and pesticides, improved seed varieties, and better cultivation practices. These are also the components of the developing countries' recent Green Revolution, which has been characterized by the adoption of high-yielding, semidwarf varieties of wheat and rice (HYV's).

Greening of Asia. Outside of Mexico, where high-yielding wheats were first introduced in the late 1940's, HYV's have so far been concentrated largely in Asia—and there, only in a few countries such as India, Pakistan, Bangladesh, Indonesia, and the Philippines.

Despite rapid expansion in the acreage planted to HYV's, no Asian country has reached full adoption for several reasons, both agricultural and economic. Basically, farmers in many areas have been inhibited by restrictions on farm size, tenure, and credit availability, by economic uncertainty and risk, and by unfavorable agricultural or climatic factors, such as lack of irrigation.

Crucial inputs. There's also the question of required inputs. While the high-yielding grains have a proven potential, their use alone does not automatically guarantee better yields. Improved water control, greater use of fertilizer and farm chemicals, and more precise management practices involving seedbed preparation, seeding rates, and timing of chemical and water applications are of great importance.

If any one of these associated inputs is lacking, the high-yielding varieties may produce disappointing results.

But farmers frequently fail to adopt all of the recommended cultivation practices, even if they fully adopt the HYV's. Many yield-raising inputs are costly, especially fertilizer. Consequently, some farmers have setted for a modified input package with a rather low fertilizer investment. This provides some increase in yields without exposing farmers to high economic risks in bad years.

Managerial roadblocks. The needed inputs may also not be available in the right form at the right time, a factor that tends to discourage the use of new technologies. A case in point is the management of irrigation canals in many developing countries, where underutilization of new irrigation facilities is a common problem.

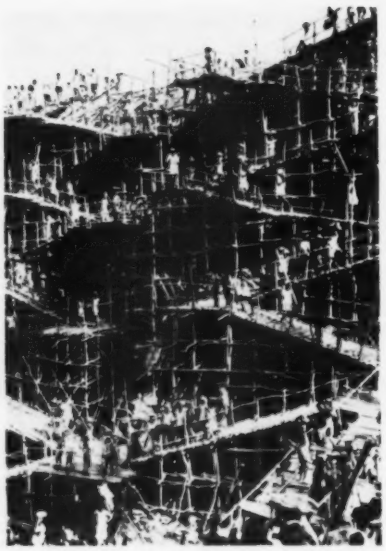
This underutilization has been attributed to various causes—tradition-bound peasants, other social and cultural factors, scarcity of local investment resources, and lack of cooperation—but the timing and quantity of water supplies have generally been neglected.

Under several systems of canal operation, farmers have no means to adjust irrigation water to match their crop needs.

Need for water control. Consequently, the HYV's and their associated inputs, which require careful irrigation control, tend to be used more by farmers who've also invested in private tubewells than by those totally dependent on the canals for irrigation water.

Much of the rapid spread of small, private tubewells in northern India and Pakistan, for example, often occurred in areas already well served by canals. This suggests that many farmers are willing to invest heavily in a water supply that they can control to meet their needs.

Unfortunately, tubewells are not possible under some geological conditions and in areas where ground water is too saline or too deep. They are also rather costly for individual small farmers. Many analysts, therefore, urge that irrigation projects be designed to provide the farmers they serve with maximum water control.



Dam construction for a new source of hydroelectric power in India.

The question of seeds. At this point in the Green Revolution, there is a tendency to take seeds for granted.

Ethiopian merchant prepares his wares at a market in Addis Abada.

Lightning: could mean the end of a drought, or a devastating flood.

But seeds must constantly be improved and bred for local conditions, particularly as HYV acreage expands, and much of this work must be done in the country or even the local area where they are used.

Most developing countries, however, do not have a highly advanced seed industry or distribution network. FAO has suggested that this is one of the main bottlenecks limiting the rapid and sustained spread of the high-yielding grains.

However, if the Green Revolution has not provided an instant solution to the food deficit problems of the countries that have embraced it, neither has it failed them even if shortages have reemerged.

Only a few years have elapsed since the HYV's were first disseminated in Asia. Economists note that even in the U.S. and Mexico, it took about 2 decades for hybrid corn and high-yielding wheat to achieve full adoption and sustained high yields. At the very least, Asia has several more years to go.

The vagaries of weather: flooding destroys crops and land in Kansas.

Weather and Climate

One of the most important factors determining food supplies is also the least controllable. Changes in weather patterns can spell big trouble to traditional and modern farmers alike, and according to some analysts, the world had best prepare to tighten its belt.

A number of recent scientific and popular articles have suggested that the "good" weather of the past half-century or so is giving way to a cooling trend, and that the impact on agriculture, and ultimately on mankind, could be disastrous.

Signs of change? Observers have pointed to unusual weather aberrations in the past several years—persistent, widespread droughts, heavy flooding, changes in the severity of winter weather, and shifts in monsoons—as signs that global changes in climate are in progress.

Much of the speculation and foreboding has focused on the gradual cooling of the Northern Hemisphere since the 1940's, following a warming trend that began around 1880.

Some researchers believe the cooling trend could be the first sign of a new period of glaciation. Others have hypothesized that the cooling effect has disrupted world wind patterns in recent years, blocking monsoons from interior land areas, such as the Sahel and India.

Meteorological debate. But while the possibility of a major shift in climate is certainly cause for anxiety, such forecasts have been questioned by many meteorologists. Most meteorologists agree that climatic change is not entirely random in nature, but there is no general consensus that these changes are predictable for decades ahead.

A primary stumbling block to studying variations in weather and climate is the lack of precise, long-term meteorological records.

Available records date back only 100 years or so, leaving evidence of broad, longrun changes to be gathered from historical writings and natural phenomena.

Elusive equation. Consequently, while it is known that weather and climate do change in response to an extremely complex interaction of forces among land and water masses, the atmosphere, and the sun's radiant energy, these relationships are difficult to quantify for predictive purposes.

And within the perspective of available meteorological records, recent weather aberrations may well be only "normal" variations.

However, after reviewing historical weather trends, the Interdepartmental Committee for Atmospheric Sciences concluded that the present climate is much warmer than the average of the past several centuries, and that a return to cooler conditions is a realistic expectation in the long run. Whether this will occur, and if so, how soon or how rapidly, is anyone's guess right now.

Growth in Demand

The supply side of the food question is critical, but it is still only half the picture. Growth in demand will play an equally crucial role in the world's future ability to feed its people.

Demand for food depends primarily on population and income growth, the level and distribution of income, and the proportion of income spent for food.

Between 1957 and 1973, total world population jumped by 1 bil-

lion to an estimated 3.8 billion people. Although the growth rate has leveled off since the 1950's to just under 2 percent yearly, this still amounts to an annual increase of about 70 million people—nearly double that in 1950.

Lopsided growth rates. But of fundamental importance to food demand is the great spread between the growth rates of developed and developing countries. Excluding the centrally planned economies, population growth has declined to 0.9 percent annually in the developed world, while developing countries are expanding by more than 2.5 percent each year. With over 70 percent of the world's population now, the developing nations are projected to have 75 percent, or three times as many people as the developed countries, by 1985.

Growth in all developing regions continues to be high, with South and Southeast Asia recording the largest absolute gains. West Asia, Africa, and Latin America are also growing rapidly.

Until recently, income had been rising at a substantial pace as well, providing the primary stimulus to food demand in developed countries. Income growth rates have fluctuated with economic upswings and downturns in the 1970's, but in the 1960's, annual boosts in gross national product per capita averaged 3.9 percent and 3.2 percent, respectively, in developed and developing nations.

Rising grain demand. World demand for grains advanced rapidly from 1967-72—a result of population and income growth and the particularly low grain prices of the late 1960's.

In the affluent developed countries, grains were used mainly to feed a growing taste for livestock products. In developing countries, where grains are basic foods, population growth largely accounted for the vigorous expansion in demand, although income played a strong secondary role.

As incomes rise, a smaller share is spent for food. At least half of total income is allocated for food in most low-income countries, while the proportion drops to less than one-fifth in the highest income countries.

Income and tastes. The kinds of foods consumed also vary with levels of affluence, reflecting the widening range of preferences that can be indulged with higher incomes. On the lowest end of the scale are roots and tubers, followed by coarse grains. Boosts in income result in progressively greater consumption of other cereal grains, pulses, fruits and vegetables, and finally, at the top of the scale, animal products.

Also important to the structure of food demand are differences in the way income is distributed within nations. A study covering 56 countries indicates that income distribution is more unequal in developing than in developed countries, and that income inequality tends to increase during the early stages of economic development.

Narrowing gap. Countries with average per capita incomes of $200-$300 have the most unbalanced distributions. But as incomes rise above $300, the gap between rich and poor begins to narrow slowly at first, and then more substantially as countries reach the higher income levels of $1,000-$2,000 per capita. The least inequality of distribution is found in countries with average per capita incomes of $2,000 or more.

These characteristics of food consumption at different income levels, and changes in income distribution over time, have several implications for food demand in the next decade.

According to World Bank figures, two-thirds of the world's population —more than 2 billion people—live in countries where per capita incomes average $200 or less. Although their incomes are expected to rise, no substantial changes will occur in average per capita incomes for some time. As a result, they will continue to rely most heavily on grains, tubers, and root crops for food in the years ahead.

Focus on grain. Also, since quite a few of these 2 billion people have incomes considerably lower than $200, and this group may grow proportionately larger as development progresses, world demand for food will be strongly influenced by the demands of low-income consumers. In this sense, the food situation for large parts of the world will continue to be a problem of grain—its availability and price.

A Frustrating Year

Despite earlier hopes for a record harvest, 1974 will go down in the books as a disappointing year for world agricultural output.

Contrary to the upward trend of the past 2 decades, world production did not increase over the 1973 level, and per capita production declined nearly 2 percent. In the past 20 years, total world food production has dropped only once —in 1972.

The primary culprit in 1974 was poor weather that crippled crop yields in the U.S., Canada, parts of the Soviet Union, and South Asia. Although record grain acreage was harvested, world grain output probably dipped 5 percent below 1973's total, and 4 percent below the 1960–73 trend. Sharp dropoffs in coarse grains accounted for much of the slump.

As a result, grain stocks in major exporting countries will again be drawn down to meet projected consumption needs, and food supplies and reserves in parts of South and Southeast Asia will be lower than in 1973.

Total agricultural production did increase in the developing nations as a group, but gains in Latin America, the People's Republic of China, and Africa were largely responsible. In developing Asia, drought in India and heavy flooding in Burma and Bangladesh extensively damaged crops. Asia's rice crop is down about 5 percent from 1973.

Current food and economic problems are critical in a number of developing countries where high oil, food, and fertilizer prices have created severe financial pressures. Many of these nations can expect significant balance of payment deficits this year.

THE WIDENING FOOD GAP

Economists projected several alternatives for grain consumption and prices in the next decade, based on different levels of import demand and varying rates of economic recovery and income growth. However, the major points stressed by the projections are essentially the same in all of the analyses.

In contrast to gloomier forecasts of population outgrowing productive capacity, USDA's outlook indicates that world production can keep pace with demand in coming years, and permit increased per capita food consumption in the developing world.

In fact, if demand for imports is constrained by lagging income growth, high internal prices, or restrictive policies, production of cereal grains could well exceed consumption. The results could be lower prices, a rebuilding of grain stocks, or expanded concessional sales to low-income countries.

Lower grain prices. In any event, by 1985 grain prices in real terms are projected to be significantly lower than today's high levels, even if there's a strong demand for grain imports. But higher oil, fertilizer, and other input costs are likely to keep world prices above those prevailing in the past.

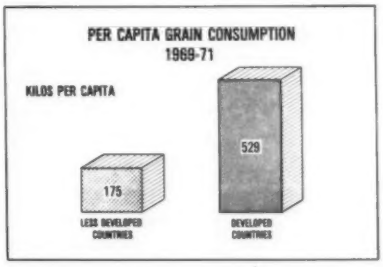
However, there's a catch even to the more favorable projections of grain supplies and prices. Population in the developing world is expected to grow by 2.7 percent yearly, spurring substantial increases in demand for food grains that will be difficult to meet with domestic production.

Improvements in the developing countries' diets would therefore come only at the expense of greatly expanded grain imports as their food deficits continue to widen into the 1980's.

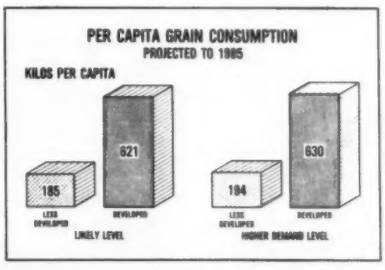
Mounting import needs. These net imports could range from 48 to 72 million tons by 1985, compared with 18 million tons in 1970. Only stepped-up use of fertilizer, irrigation, and other yield-raising inputs would drop potential imports below current levels.

Where production of a particular grain falls short of demand—which is the case projected for the developing nations' rice crops—the gap will likely be filled by increased consumption of wheat. In terms of food equivalent, wheat is cheaper to import than rice, and countries with limited foreign exchange are expected to give food grains priority over coarse grains.

Growth in feed grains. However, on a worldwide basis, consumption of wheat and rice is projected to lag behind coarse grains because of the faster growth in feed demand generated by expanding livestock and poultry production. Growth in the livestock sector will continue to be the big factor in the developed countries' grain demand.



Per capita grain consumption will rise faster in developed countries.

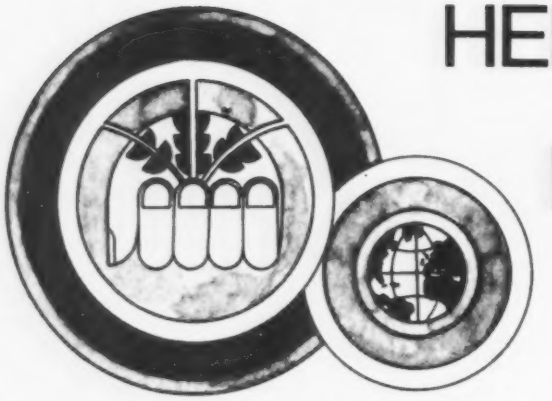


In these nations, demand for wheat is not expected to show much gain, except as a rice substitute in Japan and as livestock feed in the European Community. Rice demand will likely increase, but not fast enough to become an important factor in Western diets.

Balancing food and feed. Grain import needs over the next decade may well hinge largely on the extent to which developing countries and lower income developed countries build up a livestock sector and follow the feed usage patterns of the U.S. and the European Community.

If the developing nations continue on an essentially cereals diet, and if consumption of animal protein rises only moderately in developed countries, world grain exporters should have no serious problems meeting world import demand at reasonable prices. Even if feed use expands somewhat in developing nations, production should be sufficient to prevent excessive price hikes.

On the other hand, if income growth kindles substantial demand for livestock products, grain prices could be pushed up, and problems in funding the developing countries' grain imports could become increasingly severe.



HELPING THE POOR

When it comes to food aid to the world's needy, the U.S. is far and away the biggest provider.

During 1965-73, food aid programs had a value of almost $11 billion, including grants and concessional sales. Of this, we contributed 80 percent, Canada 7 percent, Japan nearly 3 percent, West Germany and France about 2 percent each, and other developed countries the remaining 6 percent.

U.S. involvment in food aid to developing nations goes back to 1955 and the launching of the Public Law 480 Program (P.L. 480), also known as the Agricultural Trade Development and Assistance Act. The purpose and structure of P.L. 480 have changed through the years.

New emphasis. No longer a primary instrument of disposing of farm surpluses, the law is today aimed at helping developing countries via concessional sales at easy credit terms. However, grants and donations continue to be an important part of the U.S. food aid effort. In fiscal 1974 about 12 percent—$122 million—of all exports under P.L. 480 moved under Title II of the law in the form of government-to-government donations for disaster, refugee, and special emergency relief, donations through U.S. voluntary relief agencies, and donations to the World Food Program (WFP).

U.S. First With WFP. The WFP, a joint program of the United Nations and the Food and Agriculture Organization, claims a membership of more than 100 countries. The U.S. has been the chief donor, with 46 percent of the value of WFP aid since 1962.

Our contributions to the World Food Program under Title II of P.L. 480 came to over $55 million in fiscal 1974—an increase of about 50 percent from the previous year. And for 1975/76, the U.S. has pledged to underwrite up to one-third of the $440-million target of the World Food Program. As with the other titles of P.L. 480, the original goals of Title II have been modified.

Top priority now goes to feeding the groups most vulnerable to malnutrition—pregnant and nursing mothers and preschool children.

Leading recipients. Under all titles of the P.L. 480 Program, the leading recipients last fiscal year included South Vietnam, Cambodia, India, Bangladesh, Pakistan, the Philippines, Israel, Morocco, Republic of Korea, and Indonesia.

The U.S. also subscribes to the Food Aid Convention, set up in 1967 as part of the International Grains Agreements. Among other goals, the Food Aid Convention strives to encourage developed countries to share the burden of providing food aid to developing countries. Contributions under the Food Aid Convention may be made directly from one country to another (the U.S. mainly uses this method), or through the WFP. The European Community (EC) recently became a large donor of food aid to developing countries through the WFP, and it plans to provide some $300 million worth in 1974-75.

When the bin goes dry . . . Aside from their size, the aid programs of the U.S. and EC have something else in common that raises policy questions about the long-term outlook for food aid: food aid programs of the U.S. and EC resulted from a buildup of surplus agricultural products during the 1960's. Will we and other developed countries be willing to commit our food aid in periods of shortage as well as surplus? Only time will tell.

Another point of debate has to do with the object of food aid. The developed nations agree that food aid should be available in emergency situations. They also agree that developing countries hard hit by rising prices for food, oil, and fertilizer may need special assistance in the short run.

Dark side of food aid. But many authorities question the wisdom of food aid on a long-term basis. They believe it should be weighed against alternative forms of aid that would fuel the economies of poorer nations, thus enabling them to take better care of their own food needs over the long pull. Put another way, food aid may discourage higher agricultural production in the less developed world.

A third policy issue concerns the need for wider sharing of food aid efforts. In the last half of the 1960's, the U.S. accounted for about nine-tenths of total world food aid. But as the shortfalls of 1972-74 well demonstrated, the U.S. cannot always be the leading residual supplier of the world's food needs. U.S. assistance has been leveling off since 1970, whereas the programs of other developed countries have grown substantially. Nevertheless, the total quantity of food aid has declined, and it cannot be increased unless additional financial commitments are made.

Most people equate U.S. food aid with Uncle Sam. They're right. The lion's portion of our aid to less fortunate nations—and in 1965–73 the U.S. gave four-fifths of the value of all food aid programs—comes from the Government of this country.

Food aid is more than just Government, however. A number of voluntary agencies have lent a generous hand in this campaign, especially in helping to distribute food. CARE is among them. Other major donors, Catholic Relief Service and Church World Services.

Unfortunately, the huge stockpile of surplus food we had in the 1960's has pretty much disappeared. Nonfat dry milk, for example, is gone from the surplus list. But one way or another, the U.S. will find the means to honor its commitments to the needy nations.

THE PRICE OF PLENTY

Almost everyone who has studied the world food situation agrees that we need bigger grain stocks than we have now.

In times of low grain reserves—and that is the situation now facing the world—grain prices bounce up and down with swings in output. This in turn triggers wide fluctuations in other food prices. When the change is on the up side, the poorest consumers of the world shoulder the hardship.

On the other hand, large grain stocks burden the taxpayers of the countries holding the reserves. In the past, notably since 1967 and until the past few years, these countries took the logical course of reshaping policies to slow down the growth of grain production.

The issue boils down to who should bear the costs of maintaining the stockpiles that most people want.

U.S., Canada big on reserves. The U.S. and Canada in past years have held most of the world's reserves of grain. In 1961, for instance, the U.S. held under Government programs over two-thirds of the world's entire carryover of wheat and coarse grains, not counting the U.S.S.R., the People's Republic of China, and East Europe.

Today it's a different story. U.S. Government stocks have been depleted. At the start of 1974/75, U.S. grain stocks—Government and privately held—totaled just 27 million tons, down from 41 million a year ago. Significantly, almost all of this was in the hands of private industry. But the United Nations says there are not likely to be enough "private incentives to hold stocks against unforeseen crop failures, or successively poor crops."

Our position. The official U.S. position is that since grain stocks benefit the entire world, other countries should share the costs of building and holding them.

The hitch is that many of the nations needing this grain aren't equipped to keep the stocks, either because they lack the experience or else lack the facilities and machinery. One solution might be to use international funds to add storage capacity in developed countries, with the understanding that the stocks would be available on demand to the country owning the grain.

The level of reserve stocks over and above working stocks that might be needed will depend in part on the degree of protection desired. If the objective were to cover 95 percent of the single-year grain production shortfalls based on the 1960-73 trend, somewhere between 56 and 80 million tons would be needed, depending upon the degree of substitution among grains. The level also assumes agreement among countries to share stocks and the absence of trade barriers.

The price tag. The cost of maintaining world grain reserves at this level would be relatively low—$550 to $800 million a year with annual interest and storage charges of $10 a ton. This assumes lower-than-current grain prices and moderate interest and storage charges. Higher prices and interest could raise the estimate to $15-$20 a ton. These costs could be divided among countries in line with their ability to pay, or according to how their grain production fluctuates, or in relation to the benefits they get from the program.

Some observers feel we could make do with less stocks with a better system of information . . . better forward planning between importers and exporters . . . better adjustments in grain production.

If we knew, for example, about a likely crop failure in Bangladesh, the world's big grain countries could brace for it. Unfortunately, the information often arrives too little and too late.

Early warning. The Food and Agriculture Organization (FAO) of the United Nations for some years has tried to keep abreast of crop failures and their impact on the world food picture through an "Early Warning System for Food Shortages." The system has suffered from a lack of hard data and from the absence of participation by some countries, such as the U.S.S.R. which is not a member of FAO. To eliminate these gaps in data, the World Food Conference recommended that the system be greatly strengthened and expanded.

The Food and Agriculture Organization has also proposed a two-pronged scheme of nationally held stocks, and an exchange of information and international consultation. The backers say this voluntary approach would not overburden a few countries with maintaining reserves for the rest of the world. Exporting countries, as well as the importers, would pitch in.

Food enough for all? In the words of Quentin M. West, ERS Administrator: "Everyone concerned about the world food situation needs to

(Continued on page 22)

India is one of many developing nations where rampant population growth puts a strain on food supplies. Mobile family planning clinics, like the one above, have been brought into service to help stem the population boom. Below, a family planning worker explains the functions of a diaphragm to mothers who often lack information on how to use the devices available to them. The U.S. is not the only nation helping India in this effort—the van was a gift from Swedish women.

How fast does it take to count to 75 million? By the clock that ticks off world population growth, it takes a year. At the current growth rate—about 2 percent annually—the globe will be inhabited by 6 to 8 billion people by the year 2000, almost twice as many as we have today.

"My own judgment," says USDA Secretary Earl L. Butz, "is that there are two equal parts to the world's food equation. One is the urgent need to increase food production in developed and developing countries alike. The other is the overwhelming need to slow down the rate of population increase. To falter in either, or to fail at either, is to court disaster."

For years the Agency for International Development has been cooperating with voluntary U.S. groups and other governments in worldwide family planning programs. Much progress has been made. But much more needs to be done if man is to control his numbers, and as Secretary Butz puts it, if man is to not "recklessly eat himself into oblivion by nibbling away at the earth's resources at a faster rate than the earth can combine those resources into food . . ."

see the importance of treating the whole issue, not only parts. Clearly, population growth must be curbed. Technology used in all parts of the world must be improved to increase agricultural production, to make food distribution to and within countries more efficient. There's plenty of work here for all of us, whether or not we're involved directly in agriculture."

[Based on *The World Food Situation and Prospects to 1985*, FAER No. 98, by the Foreign Demand and Competition Division. This study was coordinated by Joseph W. Willett and William Gasser. Harry Walters, International Bank for Reconstruction and Development, directed the study and prepared the original manuscript. Principal contributors were L. Jay Atkinson, Linda Bernstein, Charles Hanrahan, Harry Trainor, Richard Kennedy, Tony Rojko, Pat O'Brien, Dana Dalrymple, Richard Reidinger, Scott Steele, Richard McArdle, Rod Steele, Arthur Mackie, Hal Goolsby, Joseph Barse, Riley Kirby, Charles Gibbons, Robert Tontz, Sharon Webster, and Orville Aarons. Angela Wray, Information Div., was editor.]

Recent Publications

Single copies of the publications listed here are available free from The Farm Index, Economic Research Service, Rm. 1664–So., U.S. Department of Agriculture, Washington, D.C. 20250. However, publications indicated by (*) may be obtained only by writing to the experiment station or university. For addresses, see July and December issues of The Farm Index.

Bonus Food Stamps and Cash Income Supplements: Their Effectiveness in Expanding Demand for Food. Robert B. Reese, J. Gerald Feaster, and Garey B. Perkins, National Economic Analysis Division. MRR-1034.

Bonus food stamps are about twice as effective as cash income supplements in expanding demand for food, this study indicates. In early 1973, demand expansion generated by stamps accounted for nearly 1 percent of total U.S. food expenditures, and the value of bonus stamps had soared to more than $2 billion. Participation by qualifying households had jumped to more than 12 million persons—up from 3.3 million in 1969. A major increase in food stamps issued continued in 1974 because of higher food costs.

U.S. Agricultural Exports Under Public Law 480. Foreign Demand and Competition Division. ERS-Foreign 395.

This publication presents a statistical summary of agricultural exports made under food aid programs authorized by the Agricultural Trade Development and Assistance Act of 1954, as amended, and by Mutual Security (AID) programs. Updating a previous report issued in 1967, this study reports exports by commodity group, value, and quantity for each fiscal year from 1955 through 1973. The value of exports by country is given for each year and for the total period. Exports under credit sales programs are tabulated by commodity group and by country.

A Simulation of Irrigation Systems: The Effect of Water Supply and Operating Rules on Production and Income on Irrigated Farms. Raymond L. Anderson, Natural Resource Economics Division, and Arthur Maass, Harvard University. Tech. Bull. No. 1431.

Using a digital computer model of irrigation systems, researchers were able to examine the effects of varying water supply restrictions, water delivery rules, and crop patterns on crop production and farm income in an irrigated area. The main objective of the study was to develop and test procedures by which operators and builders of irrigation systems can evaluate alternative methods of distributing water among farmers.

Tannery Costs: Fresh Versus Salt-Cured Cattle Hides. Herbert H. Moede and Frederick J. Poats, National Economic Analysis Division. MRR-1032.

From this study of a model side-upper tannery, researchers concluded that using fresh instead of salt-cured cattle hides could increase earnings by $2.07 per hide because of reduced processing time and greater leather yields from fresh hides. Economists also noted that the cost savings and higher revenues from fresh hide processing would more than offset pollution control costs in tanning operations.

Costs of Building and Operating Rice Drying and Storage Facilities in California, 1973. Dale L. Shaw, Commodity Economics Division. AER-276.

This report analyzes operating costs and investment requirements in California's rice drying and storage facilities, using 11 models of different plant sizes, types, and utilization rates.

The U.S. Food and Fiber Sector: Energy Use and Outlook. Prepared by the Economic Research Service for the Subcommittee on Agricultural Credit and Rural Electrification of the Committee on Agriculture and Forestry, U.S. Senate.

The U.S. food and fiber sector is a highly complex interrelated system that requires about 13 percent of our total energy. The study examines the energy needs of several industries of the food and fiber sector—input supply, farm production and family living, food processing, and marketing and distribution—and the impact of rising fuel costs on food prices. By 1980, the energy demands of these industries are projected to reach 5,196 trillion Btu—up more than 11 percent from 1970.

Economic Trends

Item	Unit or Base Period	1967	1973 Year	1973 Nov.	1974 Sept.	1974 Oct.	1974 Nov.
Prices:							
Prices received by farmers	1967=100	—	172	181	178	185	182
Crops	1967=100	—	164	181	211	228	224
Livestock and products	1967=100	—	179	183	154	155	153
Prices paid, interest, taxes and wage rates	1967=100	—	145	152	175	176	178
Family living items	1967=100	—	138	171	166	167	171
Production items	1967=100	—	146	153	182	183	183
Ratio [1]	1967=100	—	119	119	102	105	102
Wholesale prices, all commodities	1967=100	—	134.7	139.2	167.2	170.2	171.9
Industrial commodities	1967=100	—	125.9	130.1	162.9	164.8	165.8
Farm products	1967=100	—	176.3	184.0	182.7	187.5	187.8
Processed foods and feeds	1967=100	—	148.1	151.9	176.8	183.5	189.7
Consumer price index, all items	1967=100	—	133.1	137.6	151.7	153.0	154.3
Food	1967=100	—	141.4	150.0	165.0	166.1	167.8
Farm Food Market Basket: [2]							
Retail cost	1967=100	—	142.3	151.2	164.3	164.6	166.4
Farm value	1967=100	—	167.2	169.6	176.6	180.0	180.4
Farm-retail spread	1967=100	—	126.4	139.6	156.5	154.8	157.6
Farmers' share of retail cost	Percent	—	46	44	42	42	42
Farm Income: [3]							
Volume of farm marketings	1967=100	—	116	169	120	160	156
Cash receipts from farm marketings	Million dollars	42,817	88,590	10,874	7,920	11,542	10,700
Crops	Million dollars	18,434	42,346	6,670	3,309	7,700	7,300
Livestock and products	Million dollars	24,383	46,244	4,204	4,611	7,653	3,400.
Realized gross income [4]	Billion dollars	49.9	97.0	—	102.1	—	—
Farm production expenses [4]	Billion dollars	38.3	64.7	—	76.5	—	—
Realized net income [4]	Billion dollars	11.6	32.2	—	25.6	—	—
Agricultural Trade:							
Agricultural exports	Million dollars	—	17,677	2,086	1,380	1,712	2,353
Agricultural imports	Million dollars	—	8,383	863	751	741	837
Land Values:							
Average value per acre	Dollars	[6] 168	[7] 280	—	—	—	[8] 339
Total value of farm real estate	Billion dollars	181.9	[7] 293.0	—	—	—	[8] 355.0
Gross National Product: [4]	Billion dollars	793.9	1,294.9	—	1,416.3	—	—
Consumption	Billion dollars	492.1	805.2	—	901.3	—	—
Investment	Billion dollars	116.6	209.4	—	205.8	—	—.
Government expenditures	Billion dollars	180.1	276.4	—	312.3	—	—
Net exports	Billion dollars	5.2	3.9	—	−3.1	—	—
Income and Spending: [5]							
Personal income, annual rate	Billion dollars	629.3	1,055.0	1,100.0	1,178.0	1,185.0	1,184.5
Total retail sales, monthly rate	Million dollars	26,151	41,943	42,976	46,177	45,803	44,469
Retail sales of food group, monthly rate	Million dollars	5,759	8,811	9,135	10,363	10,431	10,455
Employment and Wages: [9]							
Total civilian employment	Millions	74.4	[9] 84.4	[9] 85.6	[9] 86.4	[9] 86.3	[9] 85.7
Agricultural	Millions	3.8	[9] 3.5	[9] 3.6	[9] 3.5	[9] 3.4	[9] 3.4
Rate of unemployment	Percent	3.8	4.9	4.7	5.8	6.0	6.5
Workweek in manufacturing	Hours	40.6	40.7	40.6	40.0	40.0	39.5
Hourly earnings in manufacturing, unadjusted	Dollars	2.83	4.07	4.17	4.53	4.56	4.58
Industrial Production: [5]	1967 = 100	—	126	128	126	125	122
Manufacturers' Shipments and Inventories: [5]							
Total shipments, monthly rate	Million dollars	46,449	71,398	76,178	85,937	88,093	86,152
Total inventories, book value end of month	Million dollars	84,655	120,870	118,435	142,975	145,062	147,135
Total new orders, monthly rate	Million dollars	46,763	73,836	78,601	87,147	86,369	84,282

[1] Ratio of index of prices received by farmers to index of prices paid, interest, taxes, and farm wage rates. [2] Average annual quantities of farm food products purchased by urban wage earner and clerical worker households (including those of single workers living alone) in 1959–61—estimated monthly. [3] Annual and quarterly data are on 50-State basis. [4] Annual rates seasonally adjusted third quarter. [5] Seasonally adjusted. [6] As of March 1, 1967. [7] As of Nov. 1, 1973. [8] As of Nov. 1, 1974. [9] Beginning January 1972 data not strictly comparable with prior data because of adjustment to 1970 Census data.

Sources: U.S. Dept. of Agriculture (Farm Income Situation, Marketing and Transportation Situation, Agricultural Prices, Foreign Agricultural Trade and Farm Real Estate Market Developments); U.S. Dept. of Commerce (Current Industrial Reports, Business News Reports, Monthly Retail Trade Report and Survey of Current Business); and U.S. Dept. of Labor (The Labor Force and Wholesale Price Index).

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